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## **OFFICIALS TOUR ICELANDIC GEOTHERMAL PLANT**

*By John Harrington*

Following up on a visit by officials from Iceland late last year, a Montana delegation recently traveled to the northern European nation to study that country's network of geothermal electricity heat.

The visit was a precursor to possible development of the renewable energy here.

Montana is thought to have decent opportunities to develop geothermal power, which uses heat from the earth's core to generate electricity or heat buildings. The western part of the state in particular is riddled with hot springs, which are one way energy from below the earth finds its way to the surface, where it can be harnessed.

Like other renewable energy sources, including hydro, wind and solar, the major costs for geothermal are up front in the building of the plant, as after that the fuel is free. That makes the business model different from gas and coal plants, which are dependent on continued input of fuel and the sometimes wild price fluctuations that come with that dependence.

But unlike wind and solar, geothermal isn't weather-dependent — it's there all the time.

"And the cool thing is, you have to have a working medium that brings that heat up to the surface, but you don't have to deplete that resource," said Kathi Montgomery, a specialist in the Department of Environmental Quality's Air, Energy and Pollution Prevention Bureau who also made the trip. "You can make a closed-loop system and keep reusing (the resource)."

Iceland heats nearly all of its buildings with geothermal heat, and produces so much inexpensive electricity (the country is rich in hydroelectric power as well) that it's luring high-energy businesses like aluminum production to take advantage of the cheap power.

Rather than power massive plants that would send electricity great distances, geothermal would likely mean a number of smaller plants powering homes in a smaller geographic area.

"The potential is here, although small distributed generation faces challenges of bureaucratic inertia within the energy world," said Ken Toole, a former state senator who represents Helena on the Public Service Commission. "But this is the way we've got to go. Our system is predicated on cheap oil, cheap coal and cheap gas, and that's not the world we're going to see."

The trip, which included meetings with several engineers and tours of power plants and district heating systems, was taken by a lawmaker from each side of the aisle in addition to a representative from the Governor's Office of Economic Opportunity and a tribal member from eastern Montana.

In Helena last fall, the Icelanders indicated a desire to invest abroad in geothermal projects, both financially and with their technological know-how.

Geothermal can be used in several forms. The high-temperature ground water can be used to power generators to make electricity, and the same ground water can be circulated through above-ground systems to heat buildings, either directly or through the use of heat pumps.

Most of the current geothermal activity in the United States is in California, which has 33 geothermal power plants that produce about 90 percent of the country's geothermal power, according to the Department of Energy. Nevada has 15 geothermal plants, and Hawaii and Utah have one apiece.

Small exploration companies are in various stages of development in other Western states, including Idaho and Oregon.

Meaningful geothermal development on a commercial scale in Montana is years away, though there are several smaller projects under way and/or on the drawing board. Warm Springs Hospital was once heated by ground water, before the infrastructure crusted up with minerals, Montgomery said, and officials are studying whether a new building at Montana Tech in Butte could be heated in a similar fashion.

Another Butte developer is determining whether ground water circulating through the old mine tunnels beneath the city can be tapped for heat.

In eastern Montana, energy development often uses a large amount of heated ground water, leading some to look for ways to capture that heat as well.

As with many innovations, increasing costs of what's presently being used will drive technology in other forms of energy.

"We do have an opportunity to look at doing this again," Montgomery said, "often on campuses or other institutions where we have the infrastructure in place. The University of Montana already uses ground water for cooling."

Geothermal will likely never meet all of Montana's electricity needs, Toole said, but even taking a measureable share of the market would make a difference — but only if the power stays in the state and isn't exported.

"In the biggest picture to me, what's happened in Montana is we had an affordable and

reliable energy system, and we sold it, and it has been disastrous,” Toole said. “I think it will force us to look at different sources of power, and geothermal is a major player in that. Between the pressure of climate change and carbon emissions, and the loss of access to hydro in Montana at the rates we had it, we’ve just got to do it.”